REMARKS

Claims 18-23 and 25-38 are pending in this application, claims 1-17 and 24 having been previously canceled. Claims 18, 23, and 25-27 are independent claims. Applicants amend claims 18 and 25-27 herein. Applicants respectfully submit that the pending claims are in condition for allowance.

Claim Rejections under 35 U.S.C. §101

Claims 18 and 25-27 stand rejected under 35 U.S.C. §101 as being directed to non-statutory subject matter. Applicants respectfully traverse the rejection.

With respect to claim 18, the Examiner suggests that the result obtained "is not tangible and not useful" (Office Action at pages 3-4). Claim 18 recites ***using both said shedding frequency value and the amplitude-related value to determine the flow rate of the one fluid phase***. The result of this determination is the flow rate of one fluid phase or a two- or three-phase fluid flow. This result is tangible and useful. The claim requires obtaining a signal from a vortex flowmeter sensor, and using that signal to make the determination described above. Claim 18 thus requires measuring a fluid flowing through a conduit, a tangible phenomenon, and does not "manipulate an abstract idea without limitation to a practical application." Further, the concrete and tangible result of claim 18 is useful to anyone needing to know the flow rates of individual phases within a two- or three- phase flow. Potential uses are discussed, for example, in the Application at page 4.

With respect to claim 25, the Examiner suggests that the body of the claim does not appear to support the preamble, because "the vortex flowmeter ... is never calibrated" (Office Action at page 2). Further, the Examiner suggests that claim 25 does not recite a useful and tangible result (Office Action at pages 4-5). Applicants amend claim 25 to recite ***calibrating the vortex flowmeter using the determined shedding frequency values and associated amplitude values***. Calibrating a vortex flowmeter is a useful and tangible result, and supports the preamble of the claim. Applicants contend that this amendment addresses the Examiner's concerns.

With respect to claim 26, the Examiner suggests that the body of the claim does not appear to support the preamble, because a "two-phase fluid flow in a closed conduit which has a vortex flowmeter through which a two-phase fluid flow is never detected" (Office Action at page 2). Applicants amend claim 26 to recite ***using a significant change in the amplitude value to detect a change between the fluid having one phase and the fluid having two phases***. Thus, a two phase fluid flow is detected. Further, the Examiner suggests that claim 26 does not recite a useful and tangible result (Office Action at page 5). The result obtained in claim 26 – the detection of a change between the fluid having one phase and the fluid having two phases – is both useful and tangible. The result requires the measurement of a tangible phenomenon. Further, the result is useful, as some flow measurement instruments may not function correctly when a two-phase flow is present. Examples of situations in which the detection of a change from a one-phase flow to a two-phase flow may be useful can be found in the Application at page 17.

With respect to claim 27, the Examiner suggests that the body of the claim does not appear to support the preamble, because "the multiple phase fluid flow ... is never monitored" (Office Action at page 3). Applicants amend claim 27 to recite ***analysing the shedding frequency and amplitude signal components of signal to monitor a characteristic of the fluid flow***. Thus, the multiple phase fluid flow is monitored. Further, the Examiner suggests that claim 27 does not recite a tangible and useful result (Office Action at pages 5-6). Claim 27 recites ***measuring the sensor signal, determining signal components relating to both the shedding frequency of said signal and an amplitude of said signal at the shedding frequency, and analysing the shedding frequency and amplitude signal components of signal to monitor a characteristic of the fluid flow***, and thus does not merely "manipulate an abstract idea without limitation." Further, the result is useful to anyone needing to monitor a characteristic of a fluid flow. Situations in which this monitoring may be useful are described in the Application at pages 4 and 17.

In light of the above, Applicants respectfully request that the Examiner reconsider and withdraw the 35 U.S.C. §101 rejections of claims 18 and 25-27.

Claim Rejections under 35 U.S.C. §112

The Examiner rejects claims 25-38 as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. Applicants respectfully traverse the rejection.

With respect to claim 25, the Examiner suggests that the phrase "may be" renders the claim indefinite. Applicants amend claim 25 to remove the phrases "may be detected" and "may be determined." Applicants contend that this amendment addresses the Examiner's concerns. Further, the Examiner suggests that the body of the claim does not appear to support the preamble. Applicants have addressed this ground for rejection with respect to the foregoing amendment of claim 25.

With respect to claims 26 and 27, the Examiner suggests that the bodies of these claims do not appear to support the respective preambles of the claims. Applicants have addressed this ground for rejection with respect to the foregoing amendments of claims 26 and 27. Applicants contend that claims 26 and 27 are in condition for allowance.

With respect to dependent claims 28-38, no reason is given in the Office Action for the rejection of these claims. Applicants assume that claims 28-38 are rejected for depending from rejected claims 25-27. Therefore, Applicants contend the above-mentioned amendment also places claims 28-38 in condition for allowance.

Therefore, Applicants respectfully request that the Examiner reconsider the 35 U.S.C. §112 rejection of claims 25-38, and pass the claims to allowance.

Claim Rejections under 35 U.S.C. §102(b)

The Examiner rejects claims 18-23, 25-28, 30-32, and 34-37 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,121, 658 to Lew (hereafter "Lew"). Applicants respectfully traverse the rejection.

The Claimed Invention and Prior Art

The claimed invention is generally directed to a method of monitoring one phase of a two- or three-phase fluid flow utilizing a vortex flowmeter. Instead of suppressing amplitude and periodicity fluctuations, as is conventionally done, the claimed invention analyzes those fluctuations and thus yields valuable information about the flow rate of one phase of the two- or three-phase flow (Application at [0029]).

Lew is generally directed to measuring volume flow rates or mass flow rates of a fluid moving through each of two flow passages. (Lew at col. 1, lines 10-14). Lew determines the volume flow rate and the mass flow rate of fluid moving through the flowmeter as a function of the outputs from a pair of flow sensors (Lew at col. 2, lines 5-9). Lew measures the vortex shedding frequency, but not an amplitude-related value, of two flow passages, and calculates a volume flow rate from those values (Lew at col. 5, line 10). As can be seen in Lew's equation (1) (Lew at column 5), Lew calculates a flow rate for the fluid as a whole. Lew does not measure the flow rates of individual flows in a two- or three-phase flow.

Claims 18-22

Applicants respectfully submit that Lew does not disclose ***determining from the signal a signal amplitude-related value related to an amplitude of the signal at said shedding frequency***, which is present in independent claim 18. The Examiner points to Figures 5 and 6, col. 2, lines 29-39, col. 3, lines 16-23, and col. 7, lines 19-40 as disclosing ***a signal amplitude-related value related to an amplitude of the signal at said shedding frequency***. However, Lew is silent as to any signal amplitude-related value in each of these passages. As noted above, Lew does not measure an amplitude-related value, relying instead on the vortex shedding frequency to calculate a combined flow rate.

Further, Lew does not disclose ***using both said shedding frequency value and the amplitude-related value to determine the flow rate of the one fluid phase***, which is present in independent claim 18. Instead of calculating the flow rate of ***one*** fluid phase, Lew calculates the flow rate of a fluid ***as a whole***.

Thus, Lew does not disclose or suggest each and every element of independent claim 18. Claims 19-22 depend from claim 18 and, as such, include each and every patentable element of claim 18. Therefore, Lew does not disclose or suggest each and every element of claims 19-22. Applicants respectfully request that the Examiner reconsider and withdraw the 35 U.S.C. §102(b) rejection of claims 18-22.

Claim 23

Independent claim 23 recites an apparatus to, among other elements, ***derive an amplitude-related value related to an amplitude of the signal at the shedding frequency, and adapted to use the shedding frequency value and the amplitude–related value to determine the flow rate***. As discussed above, Lew does not derive an amplitude related value, nor does Lew use the amplitude-related value to determine the flow rate of at least one fluid flow in a two- or three-phase flow. Thus, Lew does not disclose each and every element of claim 23. Therefore, Applicants respectfully request that the Examiner reconsider and withdraw the 35 U.S.C. §102(b) rejection of claim 23.

Claim 25

Independent claim 25 recites, among other elements, ***determining, and recording, for the flowmeter, for a range of total volume flow rates, at a range of different amounts of each phase of the fluid, a shedding frequency value and associated amplitude value of the signal,*** and ***calibrating the vortex flowmeter using the determined shedding frequency values and associated amplitude values***. As discussed above, Lew does not determine an amplitude-related value. Lew also does not calibrate a vortex flowmeter using the amplitude-related value. Therefore, Lew does not disclose each and every element of claim 25. Therefore, Applicants respectfully request that the Examiner reconsider and withdraw the 35 U.S.C. §102(b) rejection of claim 25.

Claim 26

Independent claim 26 recites, among other elements, ***obtaining from a sensor signal both a shedding frequency value related to the shedding frequency of vortices shed by the flowmeter, and also an amplitude value related to an amplitude of the signal,*** and ***using a significant change in the amplitude value to detect a change between the fluid having one phase and the fluid having two phases***. As discussed above, Lew does not obtain an amplitude-related value. Lew also does not use the amplitude-related value to detect a change between the fluid having one phase and the fluid having two phases. Therefore, Lew does not disclose each and every element of claim 26. Therefore, Applicants respectfully request that the Examiner reconsider and withdraw the 35 U.S.C. §102(b) rejection of claim 26.

Claims 27-28, 30-32, 34-36, and 37

Independent claim 27 recites, among other elements, ***determining signal components relating to both the shedding frequency of said signal and an amplitude of said signal at the shedding frequency,*** and ***analysing the shedding frequency and amplitude signal components of signal to monitor a characteristic of the fluid flow***. As discussed above, Lew does not determine an amplitude-related value. Lew also does not analyze the amplitude-related value to monitor a characteristic of the fluid flow. Therefore, Lew does not disclose each and every element of claim 27. Claims 28, 30-32, 34-36, and 37 depend from claim 27, and therefore include each and every element of claim 27. Thus, Lew does not disclose each and every element of claims 28, 30-32, 34-36, and 37. Therefore, Applicants respectfully request that the Examiner reconsider and withdraw the 35 U.S.C. §102(b) rejection of claims 27-28, 30-32, 34-36, and 37.

CONCLUSION

In light of the above, Applicant respectfully submits that all of the pending claims are in condition for allowance. Should the Examiner feel that a teleconference would expedite the prosecution of this Application, the Examiner is urged to contact the Applicants' attorney at (617) 227-7400.

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Respectfully submitted,

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